RUST GEOTECH INC.

Spectral Gamma-Ray Borehole
Log Data Report

Borehole 51-03-06

Log Event A

Borehole Information

Farm : TX	**Tank :** TX-103	**Site Number :** 299-W15-127
N-Coord : 41,602	**W-Coord :** 75,954	**TOC Elevation :** 670.83
Water Level, ft :	**Date Drilled :** 11/30/1971	

Casing Record

Type : Steel-welded	Thickness : 0.280	ID, in. : 6
Top Depth, ft. : 0	Bottom Depth, ft. : 100	

Borehole Notes:
This borehole was drilled in November 1971 to a depth of 100 ft. The entire length of the borehole was driven with 6-in. casing. There is no indication that grout was placed in the borehole.

The top of the casing is the starting depth for the logs. The casing collar is about even with the ground surface. The casing thickness is presumed to be 0.280 in., on the basis of published thickness for schedule-40, 6-in. steel tubing.

Equipment Information

Logging System : 2	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 10/1995	**Calibration Reference :** GJPO-HAN-3	**Logging Procedure :** P-GJPO-1783

Log Run Information

Log Run Number : 1	**Log Run Date :** 1/3/1996	**Logging Engineer:** Alan Pearson
Start Depth, ft.: 0.0	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 10.0	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

Log Run Number : 2	**Log Run Date :** 1/4/1996	**Logging Engineer:** Alan Pearson
Start Depth, ft.: 100.0	**Counting Time, sec.:** 100	**L/R :** L **Shield :** N
Finish Depth, ft. : 9.0	**MSA Interval, ft. :** 0.5	**Log Speed, ft/min.:** n/a

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Analysis Information

Analyst : H.D. Mac Lean

Data Processing Reference : P-GJPO-1787 Analysis Date : 9/17/1996

Analysis Notes :

The SGLS logging of this borehole was completed in two runs. The pre- and post-survey field verification spectra met the acceptance criteria established for the peak shape and system efficiency, confirming the SGLS system was operating within specifications. The energy calibration and peak-shape calibration from these verification spectra were used to establish the channel-to-energy parameters used in processing the spectra acquired during the logging operation.

Casing correction factors for a 0.280-in.-thick steel casing were applied during analysis.

A depth overlap, where data were collected by separate runs at the same depth, occurred in this borehole between depths of 9 and 10 ft. The concentrations of Cs-137 and the naturally occurring gamma-ray-emitting radionuclides (KUT) calculated using the separate data sets at the overlapping depths were within the statistical uncertainty of the measurements, indicating very good repeatability of the radionuclide concentration measurements.

The gamma-ray emitting radionuclides Cs-137 and Co-60 were detected in this borehole. The Cs-137 was detected continuously from the ground surface to a depth of about 23 ft. A zone of higher concentration occurs within this zone between the surface and a depth of 3 ft, with a peak value of about 10 pCi/g 1 ft below the surface; calculated concentrations decreased to 1.5 pCi/g at a depth of 3 ft. Most other measured Cs-137 concentrations were less than 1 pCi/g, except for the depth interval between 10 and 12.5 ft. The highest measured concentrations in this interval was about 2 pCi/g. Cs-137 was also detected at a depth of 25.5 ft at a concentration just above the MDL, and at a concentration of about 2 pCi/g at the bottom of the borehole.

Co-60 was identified in concentrations barely above the MDL at a depth of 39.5 ft. This occurrence may indicate the ultimate extent of a Co-60 plume identified in other nearby boreholes.

The K-40 concentration log has a sharp increase at 48.5 ft from a mean of about 11 pCi/g to a mean of about 15 pCi/g. The Th-232 log plot also has a slight increase in mean value at that depth. The change in background concentration of these radionuclides indicates a change in the lithology above and below this point.

The SGLS total count log plot reflects the log plots of the natural radionuclide concentrations and the contribution of Cs-137, where it occurs. There is a slight drop in the total count plot at a depth of about 87 ft, indicating a lithologic change. There is a spike in the SGLS total count at a depth of 38.5 ft that reflects a slight increase in the K-40 activity at about this depth.

Details regarding the interpretation of the data for this borehole are presented in the TSDR for tank TX-103.

Log Plot Notes:

Separate log plots show the man-made radionuclides (Cs-137, Co-60, and Eu-154) and the naturally occurring radionuclides (KUT). The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations.

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A combination plot includes both the man-made and natural radionuclides, in addition to the total gamma derived from the spectral data and the Tank Farm gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.